AARNet Advisory Board

Some Considerations on Development Strategies for AARNet

I find myself writing this short paper on the subject of the next stage of strategic development of AARNet style services in Australia, both to clear some of the issues in my own mind and also to bring the subject onto the Board agenda. I believe it is worthy of detailed discussion at this point in our development of AARNet.

Development Strategy to Date

To date the predominant driving force behind AARNet has been technical, with the introduction of the Internet wide area technology into Australia and its corresponding overseas link. From this point of view, the project has been extremely successful - fulfilling the ambitions of the larger institutions, introducing a top class service to smaller institutions, and obtaining a high level of user acceptance and appreciation throughout Australia.

The development philosophy has basically been a very conservative one - deliver good network services to the institutions, with the opportunity for companies associated with the research and development taking place in an institution to be affiliated to the network. The former has been well achieved. The latter has generated a great deal of debate on the network and created some bad feeling, in some quarters, over the AARNet charges. I think a great deal of this debate has been ill-informed and has been very well answered by people such as Geoff Huston of AARNet, and Robert Elz and Chris Chaundy of the University of Melbourne.

I suspect that most of my fellow Board members are not as involved with AARNet at the user level as perhaps I am and have probably not seen much of the above debate and thus have not been lobbied, albeit indirectly. While I had been somewhat removed from the day to day business of AARNet since the appointment of the second technical position at the end of 1989; over the last few months of holiday period, and due to some contacts within the industry, I have again found myself subjected to some of the affairs and pressures of running and developing AARNet.

Recent Approaches from Industry

One of the major strategic policies which concerns the AARNet Board is the financial development of the network to service its client base. Initially this development was funded by Universities, CSIRO and the ARC for the benefit of the owners - the Universities and CSIRO. There are many new openings which have been brought to my attention over the last few months, being typified by;

1. The approaches of Boeing to AARNet for AARNet to provide network infrastructure to service Boeing's proposed supercomputer facility - ASN. The Board is aware of earlier developments. Boeing has now issued an exploratory document to AARNet concerning the parameters of their required network. Should we encourage Boeing?

2. IBM with the SRF and others in Victoria have set up an advanced computing facility and wish to develop AARNet links within, initially, that state to service a broader use of their facilities rather than just the Universities and CSIRO. Should we be providing input to them from day 1 as to the enhanced development of AARNet in Victoria and elsewhere? Should we continue to be negative and reactionary rather than pro-active in this area?

3. The Multi Function Polis has approached AARNet to exchange information on national network development to support a country wide networking infrastructure. One of their problems is that, while the major site for the MFP is Adelaide, the major contributors are not based in South Australia but predominantly on the eastern seaboard. Again, there could be many dollars available to AARNet if its charter was widened to discuss servicing such an organisation.

4. With the imminent advent of CRCs there will undoubtedly be an increasing activity, at least formally, between the AARNet owners and the commercial world. There will undoubtedly be a requirement for AARNet to tackle more commercially orientated customers. Are we ready for that? I believe probably not.

AV-CC

Australian Vice-Chancellors' Committee

(INCORPORATED IN THE A.C.T.)

AVCC Memorandum
To: J. Mullarvey
From: G. Huston

Re: Possible IBM support for AARNet

This memorandum is to note the current situation with respect to IBM and that organisation's possible support / involvement with AARNet. As you are aware AARNet had extensive discussions with Ray Yeoman of IBM Australia some 12 months ago. These discussions proved inconclusive, due in no small part to IBM Australia lacking any clear focus as to their objectives. The only outcome, a proposal by IBM to set up a joint working group to investigate the potential areas where IBM could be involved in AARNet, was not taken up by AARNet at the time due to the priorities of focusing available resources on the installation of AARNet.

In the last 12 months there have been two factors which have evidently prompted IBM to look at AARNet with renewed interest. Firstly, within the United States, IBM, in partnership with MCI (a communications carrier) is now providing a 45Mbps backbone TCP/IP network service to the NSFnet. The vehicle for this activity is the newly formed company Advanced Network Services (ANS), a not-for-profit company jointly owned by IBM and MCI. It is understood that ANS have indicated their interest in extending services beyond the United States, and are looking at the international area in the Pacific, including Australia as a base for expanding their operations. Secondly IBM have completed the arrangements relating to their participation in the Australian Computing and Communications Institute (ACCI), an institute strongly supported by the Strategic Research Foundation of Victoria.

IBM have approached a number of individuals within the University of Melbourne and CSIRO in January to discuss AARNet and issues relating to IBM's potential involvement. It should be noted that to date IBM have not directly approached AVCC AARNet staff, (nor CSIRO MIS staff to my knowledge).

At this stage second hand reports indicate that IBM are considering undertaking some form of support for AARNet, probably directed through IBM Australia's Director of Science and Technology, Dr Greg Clark. No other details other than that rather vague statement are available to AARNet staff at present.

Naturally I will keep you informed of any further developments in this area.

All of the above are, in some way, politically motivated alliances to bring industry and the traditional R&D providers into closer contact with the assistance of government monies - DITAC, PM&C etc. These agencies have not really been in our funding considerations before. (It was to assist this type of development that we had hoped to have Bill Bostwick from the FNC to visit Australia at the time of this meeting. For various reasons this has been postponed for a few months.)

Before posing a few questions concerning how to address this corporate interest in AARNet, let me say that I believe that, no matter what commercial development takes place, the existing owners must insist on a preservation of their existing service within any expanded commercial enterprise.

Some Points for Discussion

To the difficult part. How do we deal with

1. Major grants from cooperating companies or organisations, such as IBM and the MFP.

2. Service providers, such as Boeing.

3. Large commercial partners in CRC joint research bids, such as computer companies, chemical companies, communications carriers.

4. Small local companies wishing to tap into the "intelligent society". In theory this is covered via the AARNet affiliate scheme but may need to be revived in the light of the answers to the earlier points.

Depending on the views expressed by the Board on some of the above, it may be necessary to then address some questions on Board policy and AVCC management.

1. There is a view, with which I have some understanding, that the Board is remote and too far removed from the users and their requirements. How would this be addressed, especially if we had corporate partners?

2. The AVCC Secretariat support has in general been very thin on the ground and insufficient to run a highly technical and timely project such as AARNet. On the plus side however is the very substantial contribution of the Secretariat in obtaining ARC funding for the first few years. This action probably eased the entry pain for many of the medium and smaller institutions which were wavering over joining in the early days.

   I am not certain that the new position of General Manager will solve this problem completely. If the appointment is not an entrepreneurial one, then the discussion and questions raised above will continue to rage around the Manager. If the appointment is of a dynamic outgoing person, the workload is likely to grow dramatically in the area of commercial development and the group may then again be understaffed.

3. Should AARNet be hived off as a separate organisation with the current owners having some form of overriding control to preserve the owners' current position in the technology? Such a structure may both provide the necessary services to the higher education institutions and CSIRO, while at the same time the new AARNet could develop much faster in the commercial field than it is currently able to do in its current management structure.

While I have not developed the arguments fully here, nor probably included all arguments to be considered, I hope that I have, in a short paper, given the flavour of some of what I believe are the major issues, and I would say opportunities, facing AARNet in the early part of 1991.

Dr R Erskine
Director, Computing Services
Australian National University
13 February 1991
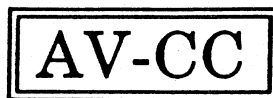
AV-CC

Australian Vice-Chancellors' Committee

(INCORPORATED IN THE A.C.T.)

AARNet: The Structures of Management

AARNet Advisory Board Discussion Paper

The previous two years of national and international activity associated with the construction of AARNet has provided a valuable opportunity to compare and contrast this effort with those of our overseas peers, and also has provided the opportunity to use the collective experience with the operation of such overseas facilities as valuable input in shaping the forward outlook of AARNet.

In many ways there have been areas of notable success in this project; the mechanisms of central funding within a uniform national program have enabled adequate resources to be applied to the project in a timely fashion; the speed at which this project has progressed from initial planning to actual delivery of services has been a unique phenomenon in the international community, which has proved possible only with a coherent direction voiced within a national context; the relative uniformity of the technical approach which has allowed the network to operate with a high degree of stability.

Compared to the many problems which have at times beset the European and American communities (generally due to the multiplicity of effort and objectives rather than any paucity of activity in this area) it is apparent that the Australian effort has avoided many of the common pitfalls of wide area network construction and in so doing has produced a single coherent infrastructure which has the potential to continue to meet the needs of the academic and research sector through the coming decade.

From such comparisons it is evident that we can take some pride in the national effort in establishing AARNet.

But in laying such strong foundations, it is prudent at this stage to carefully examine the various management issues which will surface within aspects of further development, and, on the basis of this examination, ensure that the appropriate management action is taken to ensure that we continue to provide technology-based communications services to the academic and research community in an optimal fashion.

This paper addresses some of these management issues, and nominates a number of potential activities which may prove beneficial to the AARNet program.

A Management Model for Infrastructural Research Networks

In examining management structures employed by our international peers with respect to other national academic and research networks there are a number of common factors.

The broad common objective of these activities in the application of technology-based services to meet user requirements. In achieving this objective there are three distinct areas of activity requiring management involvement:

- the statement of service requirements by the user community;

- the technology engineering effort; and

- the management process of funding, determination of policy and the provision of overall leadership to ensure relevance and cohesion of the overall effort.

Network Services
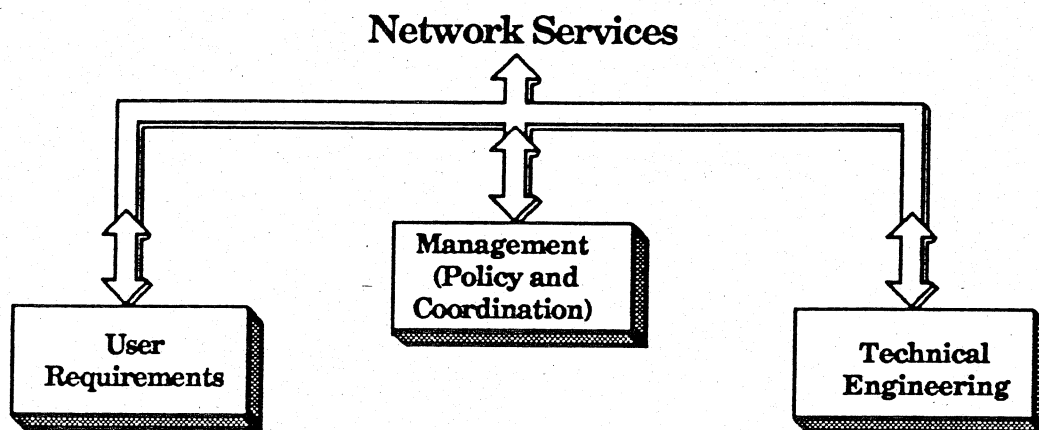
This management model is of course an abstract model, but specific examples are readily cited. Within the United States' NSFNET for example, the National Science Foundation itself performs the role of overall management and policy determination; the engineering effort is contracted to MERIT (in conjunction with MCI and IBM); and the ongoing user requirements are intended to be expressed through the activities of the various NSF funding programs.

Stating User Requirements

If there is a common area of weakness in this management model, it is the process of active participation of the user community in stating realistic goals and objectives in terms of immediate and future communications services.

Within the academic and research community this is perhaps the most significant challenge.

Without such continued input from the user community the technical effort may well drift to directions which are tangential to the ultimate service objective (and as a possible example, the United Kingdom's JANET network is considered by many to have placed itself in such a position).

Equally in terms of the management activity, without user input the management effort runs the risk on focusing on marginal areas of technology which do not deliver actual user services today. (The EEC sponsored COSINE project could be considered as a reasonable example of this situation). In this situation the most common problem is that

the objectives of the funding body are misinterpreted as the actual user requirements, and technical work then progresses with strong management involvement, but little actual user participation.

This is not a major problem in the case of enterprise-specific projects (such as the NASA or DARPA networks in the US) where funding requirements explicitly dictate user requirements, nor is it a major issue in the commercial environment where relevance to user requirements is a factor in the marketability of the service and its ultimate commercial success. However in providing infrastructural services to the broad academic and research sector the close relationship of between the user community and those involved with the actual provision of the service implies that the statement of user requirements is a very major issue.

Relating these observations to AARNet, it is evident that previous network feasibility reports prompted the user community to enumerate in some detail their requirements at that point in time (1987 - 1988), which in turn provided a working basis on which the network could be constructed. However in relating this to future directions of AARNet, it should be noted that these requirements, which formed an integral component of the initial objectives of AARNet, were voiced some two years ago.

In this area our challenge is to ensure that our continued efforts remain attuned to evolving user service requirements.

In achieving this objective it is difficult, and perhaps impractical, to implement a single body charged with stating such user requirements. A working body runs the considerable risk of concentrating on the sectional interests of the individual members of the body (almost irrespective of the size of the body, due simply because of the very diverse nature of the total academic, research, and related administration and service provision user community). Such a body would therefore need a looser and more open membership, in which case the ability to formulate and implement a working agenda would present considerable problems due to the consequent lack of a stable working membership. In general a single user forum has not been set up in our peer networks for these reasons.

Greater potential lies in the effective dissemination of information relating to current and potential services and the continuing process of gathering user response. Such a task must be an ongoing commitment of the management effort in order to ensure continued relevance and effectiveness of the total effort.

There are many tools which can assist in this effort, including the current AARNet program of newsletters and general reports, workshops, seminars, site visits, and similar information dissemination activities. Continued efforts in this area should be supported as a matter of some priority.

However the most valuable contribution within this activity is the ongoing commitment of every institutional member of the network to ensure that individual users of the facility have an appropriate mechanism by which their ongoing requirements may be voiced within the institutional domain in the first instance and within the broader national domain. It is only with the strong level of continued institutional support in this area can AARNet continue to maintain a direction which is attuned to the specific requirements of our user community.

Engineering - The Implementation of Service Delivery

One of the major distinguishing features of these infrastructural networks within the academic and research sector is the hosting of the services on technologies which are close to the leading edge of technological development.

This has been a very deliberate decision for many networks (including AARNet), prompted by the impossibility of providing many of the service requirements over the current (more technically conservative) commercial networks. However in choosing to effectively operate an "in-house" facility rather than simply purchase established services, there is a associated engineering commitment in terms of the operational aspects of the network.

This engineering commitment extends further than the simple operational integrity of a static infrastructure - it encompasses the tasks of updating the technology to track technical developments and integrating new technologies into the existing infrastructure as and when appropriate from a user service requirement.

The requirements of engineering input into the overall program can be summarized as:

- determination of what is possible

- development of applicable technology (participate in the larger world-wide effort); and

- advice relating to the consequences of deployment of new technologies (time/cost/maintenance);

- assistance with the introduction of services to the user community.

In summary, the overall objective of the engineering effort can be stated as the achievement of management objectives through the implementation of service delivery mechanisms.

Through the initial planning of AARNet a Technical Working Group provided the very necessary broad-based engineering input to ensure that the project could meet the various requirements. This Group was wound up at the end of 1989, and the implementation effort through 1990 has relied on a less formal and unstructured arrangements with a number of individuals to provide support for the central AARNet engineering effort.

Unlike the user requirements domain, it is feasible to establish a single engineering group which could play a valuable role within AARNet. Such a group would not necessarily encompass a formal structure with regular meeting schedules and totally rigid membership, but would operate more efficiently on the basis of an open membership with annual or six-monthly meetings with much of the work being performed using networking tools as the basis of communication support.

There is much in the engineering domain that such a group could address immediately, including the issues relating to the introduction of OSI-based applications, the potential use of new physical communications services, the ongoing development of Internet services and the implementation within AARNet, and similar.

Some of these engineering issues are perhaps relatively unique to the Australian context, but many are problems and issues which are common to our overseas peer networks. Continued participation in the international engineering coordination programs and encouraging an increased level of Australian engineering participation on technology development activities are the major methods by which the Australian effort can effectively utilize the output of this international engineering effort.

In summary it is nominated that the issues associated with the formation of an AARNet Engineering and Planning Group are worthy of further detailed consideration by AARNet management in the early months of 1991, with the objective of forming such a group later in the year as the major engineering component of the AARNet organisational structure.

The Management Role

The task of coordination of effort, stating of overall objectives and establishing the necessary resources to support the program falls within the management role.

The AARNet management structure is very similar to those of our peer networks, and works along broadly similar lines. As with the engineering effort, the tasks confronting the management body have a high degree of similarity with other networking operations.

These issues include (and this is not intended to be an exhaustive set):

- Determination of program objectives

- The funding position of the network, including the determination of the potential role of government funding agencies and similar central funding and funding by network membership, and the task of ensuring appropriate funding resources are available to meet objectives.

- Membership of the network and the issues of broad based membership versus a specialized academic and research membership.

- Commercialisation of the network, and the other options passing over the responsibility for delivery of current services to a commercial operation or maintaining the network as a private sector-wide service.

- Managing the cohesion of engineering effort and user requirements.

- Overseeing the strategic direction of the program and ensuring that the program is attuned to the evolving requirements of the academic and research sector.

Areas which are nominated as requiring management attention in the forthcoming year include continued attention to the integration of the emerging State-based network services management structures into the overall national management structure, and an increased focus on the various government research support programs to ensure that due attention is paid to the costs of servicing communications infrastructure requirements within such programs.